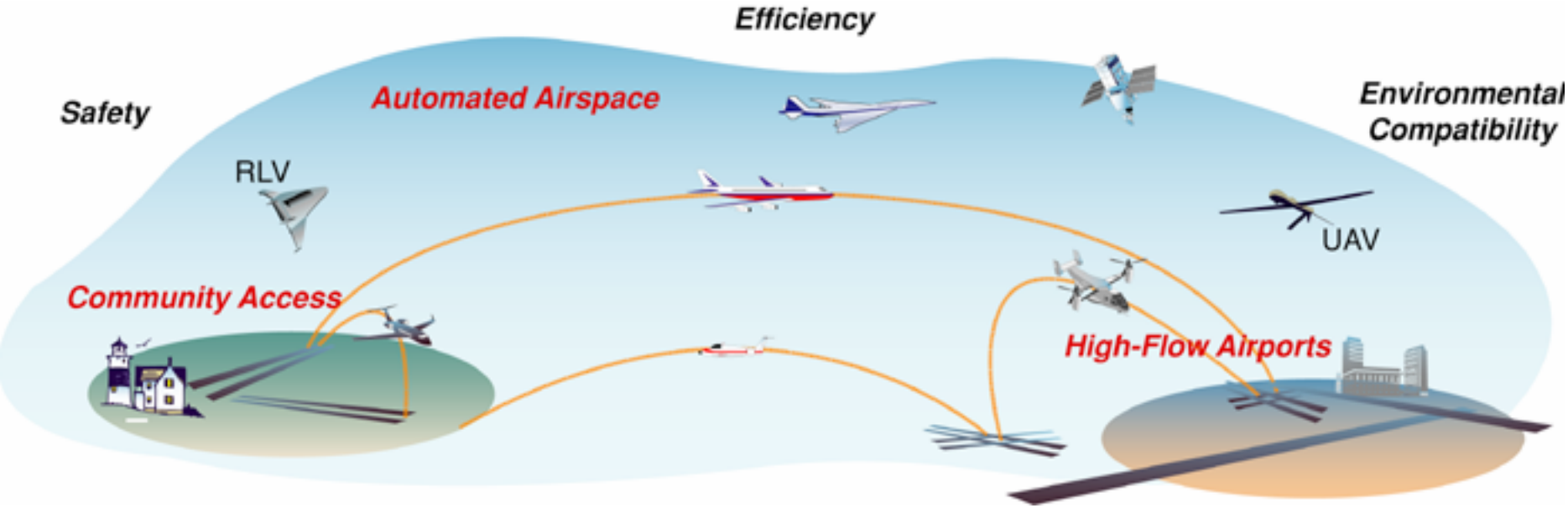
Air Transportation System Beyond Tomorrow

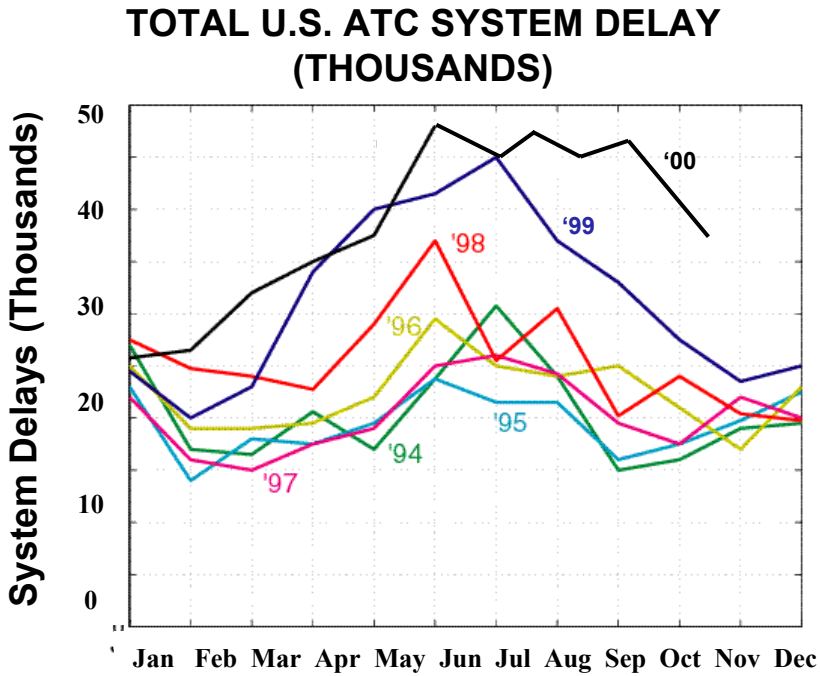


Frank Aguilera
Deputy Manager,
Aviation System Capacity Program
NASA Ames Research Center

Integrated CNS Workshop
Cleveland, Ohio
May 1-3, 2001

US Air Traffic and Growth Prediction

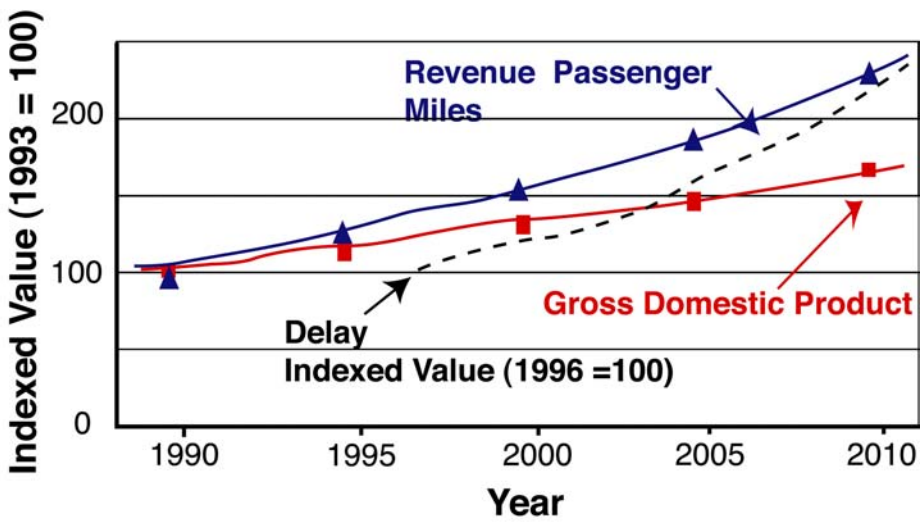
Today



Source: Aviation Week & Space Technology, October 25, 1999

- *Demand Exceeds Capacity*
- *Delays are escalating*
- *Air rage has arrived*

The Future

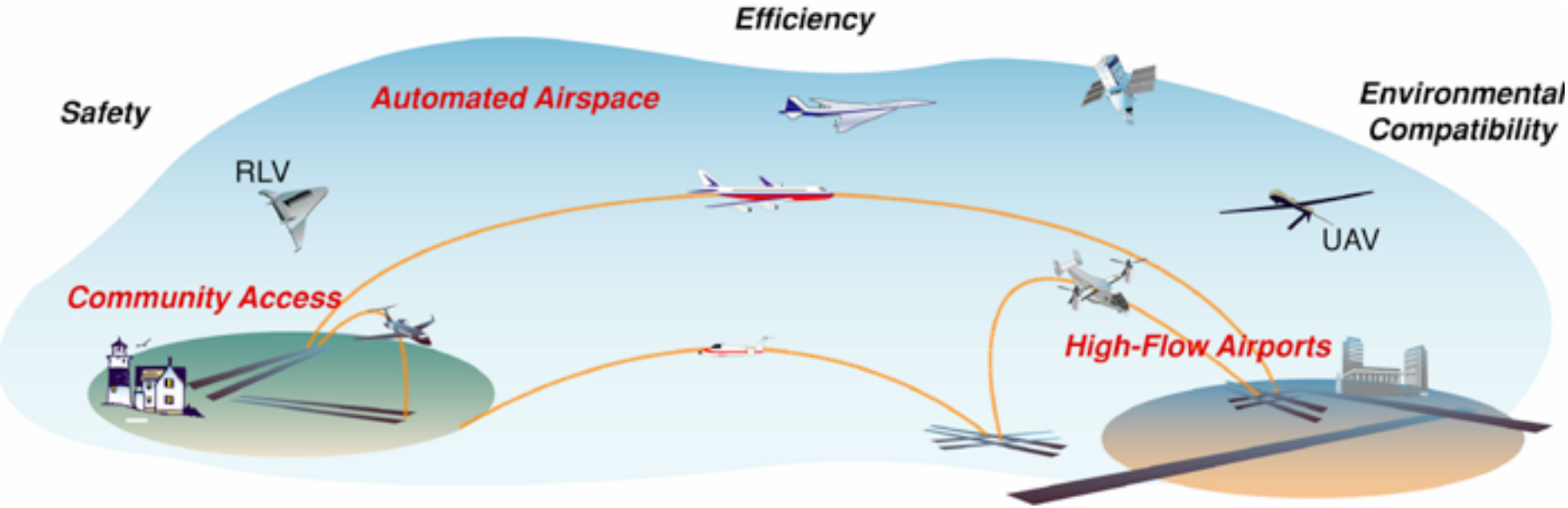


Source: FAA Aviation Forecasts, selected volumes, Logistic Management Institute (LMI), 1999

- *Demand will exceed economic growth*
- *Delays will skyrocket*
- *New emerging markets*
  - *unknown requirements*
  - *increase demand*

Vision of Future Air Transportation System

Increased Safety, Efficiency and Environmental Compatibility



- *High Traffic-Flow Airports*
- *Increased Community Access*
- *Automated Airspace*
- *All Vehicle Classes*

Hi-Flow Airports

Virtual Tower

Automated Surface Movement

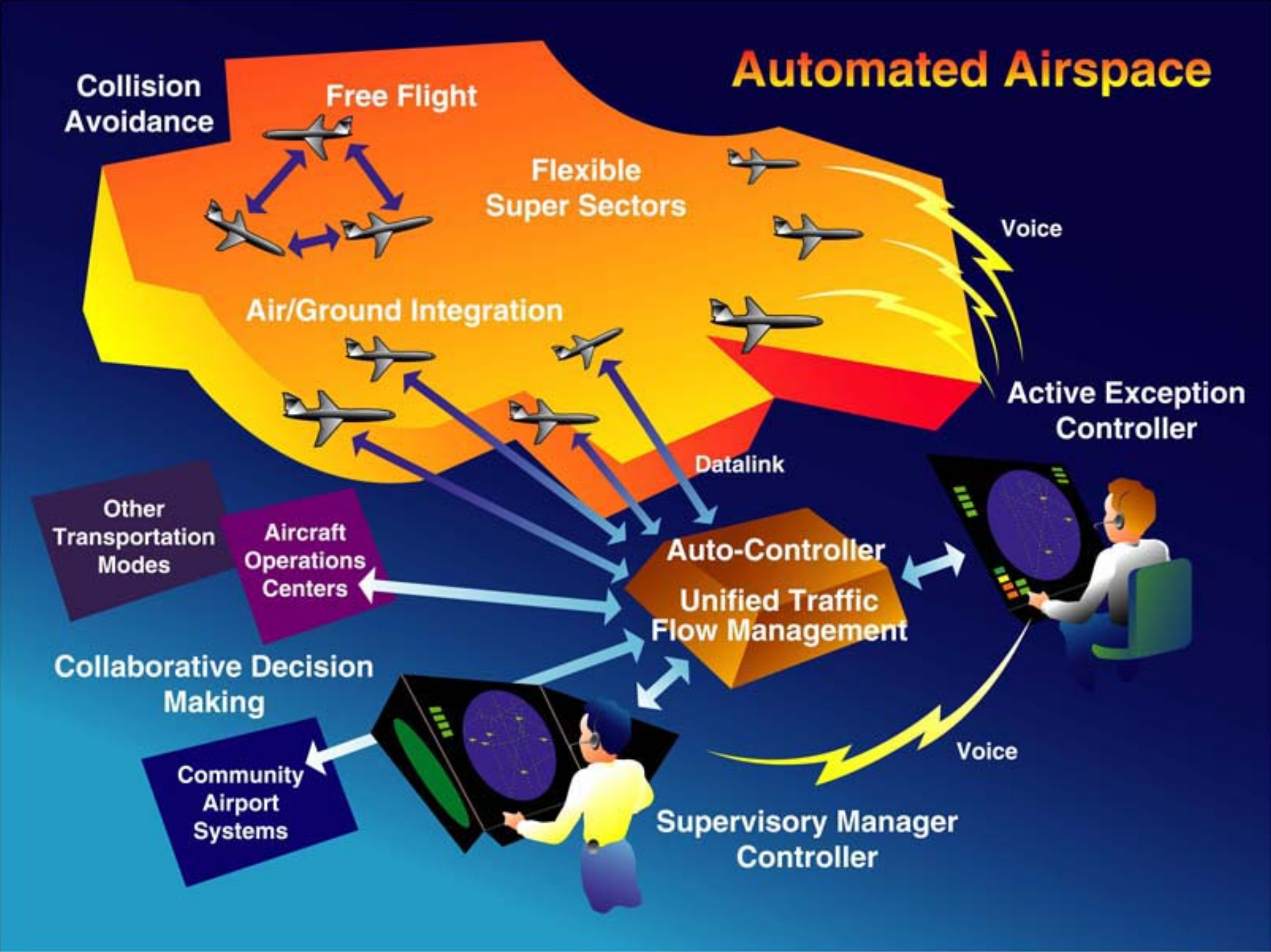
Simultaneous Non-interfering Operations

Surface Robotics

Virtual, reconfigurable Runways/Taxiways

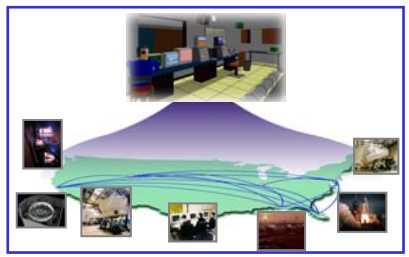
Automated, Closely Spaced Formation Flight

Increased Community Access


Automated Airspace
Collision Avoidance
Free Flight
Flexible Super Sectors
Air/Ground Integration
Voice
Active Exception Controller
Datalink
Other Transportation Modes
Aircraft Operations Centers
Auto-Controller
Unified Traffic Flow Management
Collaborative Decision Making
Community Airport Systems
Voice
Supervisory Manager Controller

Aviation System Technology Advanced Research - AvSTAR Vision

- A virtual airspace transportation environment for simulating air traffic components at the systems level with the requisite degree of fidelity
- Critical core component technologies to meet the requirements of the air transportation system
- Evaluation of candidate system-level concepts and architectures making use of the "virtual air transportation environment"



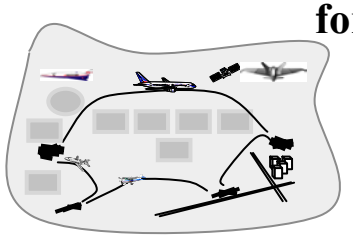
Virtual Airspace Simulation Technology

Problem identification/ Validation

System Level Definition for Simulation

Problem identification/ Validation

Sub-System Evaluation



Evaluation of Candidate System-Level Concepts

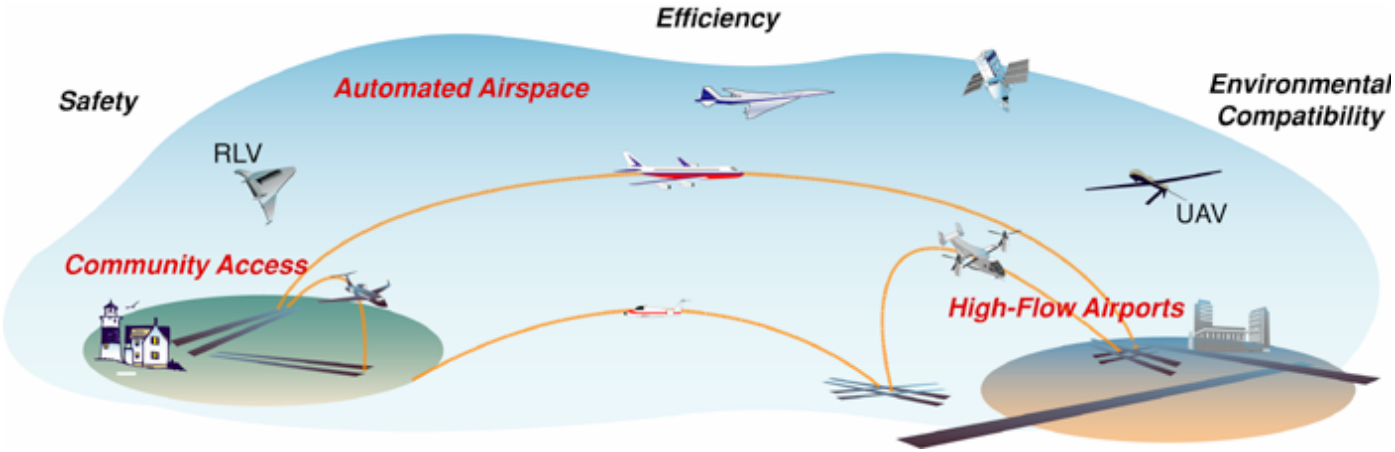
Requirements

Component technologies/ Subsystems

Core Component Technologies

Concluding Remarks

Increased Safety, Efficiency and Environmental Compatibility



- *Demand growing at ≈5% per year*
- *Constraints being addressed but not long-term solutions*
- *Must start addressing future system NOW*